



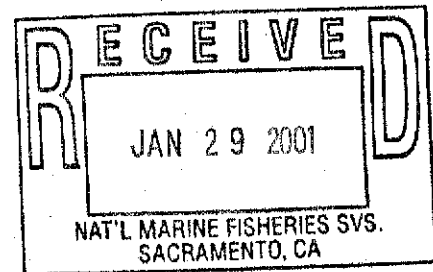
UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Southwest Region  
501 West Ocean Boulevard, Suite 4200  
Long Beach, California 90802-4213

In reply refer to:

JAN 20 2001

SWR-01-SA-0004:MEA

Mr. Lester Snow  
Regional Director  
United States Bureau of Reclamation  
2800 Cottage Way  
Sacramento, California 95825-1898



Dear Mr. Snow:

This letter transmits the National Marine Fisheries Service (NMFS) biological opinion on the proposed long-term renewal of Central Valley Project (CVP) water service contracts for the Friant Division and Cross Valley Canal Unit Contractors on Federally listed endangered Sacramento River winter-run chinook salmon (*Onchorhynchus tshawytscha*), threatened Central Valley spring-run chinook salmon (*Onchorhynchus tshawytscha*), and threatened Central Valley steelhead (*Onchorhynchus mykiss*) in accordance with section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 *et seq.*). A letter from Mr. Frank Michny (USBR) dated January 5, 2001, initiating formal consultation was received in our Sacramento Area Office on January 5, 2001.

This document also transmits NMFS' Essential Fish Habitat (EFH) Conservation Recommendations for Pacific coast salmon which may be affected by the proposed action as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended (16 U.S.C. 1801 *et seq.*). The EFH consultation is appended to the ESA biological opinion.

#### Endangered Species Act Consultation

This biological opinion and EFH recommendations are based on information referenced in, and provided with, your January 5, 2001 letter, including: 1) a draft description of the proposed action; 2) draft biological assessments for Friant and Cross Valley Divisions (dated December 14, 2000 and December 16, 2000 respectively); 3) copies of proposed Friant and Cross Valley contracts; and 4) a copy of Reclamation letter to NMFS, dated October 29, 1999, indicating the intent to continue operation of the CVP in compliance with applicable NMFS and U.S. Fish and Wildlife Service (USFWS) biological opinions. Information provided in draft Environmental Assessments for Long-term renewals for the Friant Division and Cross Valley Contractors, dated October 16, 2000 and received by NMFS on October 24, 2000 were also used in this consultation. A complete administrative record of this consultation is on file in NMFS' Sacramento Area Office, Sacramento California.

Based upon the best available scientific and commercial information, the enclosed biological opinion concludes that implementation of the proposed long-term renewal of Central Valley Project (CVP) water service contracts for the Friant Division and Cross Valley Canal Unit Contractors is not likely to



jeopardize the continued existence of Federally listed endangered Sacramento River winter-run chinook salmon, threatened Central Valley Spring-run chinook salmon, and threatened Central Valley steelhead or result in the destruction of adverse modification of designated critical habitat for these species.

Incidental take associated with the implementation of these water contracts will occur through the storage and delivery of the water. This storage and delivery is the responsibility of Reclamation and has been assessed under existing biological opinions and is being reassessed in an ongoing consultation on the operation of the CVP and State Water Project. This ongoing consultation will up date the existing winter-run chinook salmon biological opinion by adding consideration of the CALFED record of decision (August 2000) and analysis of effects on spring-run chinook salmon and Central Valley steelhead. Since describing levels of incidental take independent of operating criteria and procedures is not possible, no incidental take statement is provided in the enclosed biological opinion. Rather, incidental take of winter-run chinook salmon is provided in the existing biological opinion and incidental take for winter-run chinook salmon, spring-run chinook salmon, and Central Valley steelhead will be provided in the biological opinion that results from the ongoing consultation on project operations. NMFS expects to conclude that consultation prior to March 1, 2001.

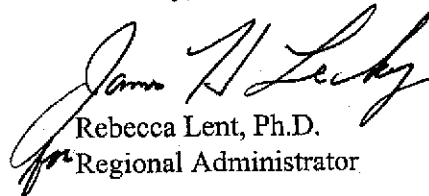
As provided in 50 CFR § 402.16, reinitiation of formal consultation is required if: (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in the opinion; (2) the action is subsequently modified in a way that causes an effect on listed species or critical habitat not considered in this opinion; or (3) a new species is listed or critical habitat is designated that may be affected by the action.

#### Essential Fish Habitat Consultation

As required by section 305 (b)(4)(B) of the MSFCMA and 50 CFR §600.90 (j), Reclamation has a statutory requirement to submit a detailed response in writing to NMFS that includes a description of measures proposed for avoiding, mitigating, or offsetting the impact of the proposed long-term contract renewals on EFH within 30 days of receipt of this letter. If unable to complete a final response within this time limit, an interim written response should be provided to NMFS within 30 days and a detailed response should follow.

If you have any questions concerning the enclosed biological opinion or the EFH conservation recommendation, please contact Mr. Michael Aceituno in our Sacramento Area Office, 650 Capitol mall, Suite 8-300, Sacramento, CA 95814. Mr. Aceituno may be reached by telephone at (916) 930-3600.

Sincerely,

  
Rebecca Lent, Ph.D.  
Regional Administrator

Enclosure

Endangered Species Act - Section 7 Consultation

**BIOLOGICAL OPINION**

**Agency:** U.S. Bureau of Reclamation

**Activity:** Long-term Renewal of Central Valley Project (CVP) Water Service Contracts for The Friant Division and Cross Valley Canal Unit Contractors

**Consultation Conducted By:** National Marine Fisheries Service, Southwest Region.

**Date Issued:** January 20, 2001

**I. INTRODUCTION**

This document transmits the National Marine Fisheries Service (NMFS) biological opinion on the proposed long-term renewal of Central Valley Project (CVP) water service contracts for the Friant Division and Cross Valley Canal Unit Contractors on federally listed endangered Sacramento River winter-run chinook salmon (*Oncorhynchus tshawytscha*), threatened Central Valley spring-run chinook salmon (*O. tshawytscha*), and threatened Central Valley steelhead (*O. mykiss*) in accordance with section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.).

This biological opinion is based on our review of information referenced in and provided with a letter, dated January 5, 2001, from the Bureau of Reclamation (Reclamation) initiating formal consultation for the long-term contract renewal of CVP water service contracts for the Friant Division and Cross Valley Canal Unit Contractors, including: 1) a draft description of the proposed action; 2) draft biological assessments for Friant and Cross Valley Divisions (dated December 16, 2000 and December 14, 2000, respectively); 3) copies of proposed Friant and Cross Valley contracts; and, 4) a copy of a Reclamation letter to NMFS, dated October 29, 1999, indicating the intent to continue operation of the CVP in compliance with applicable NMFS and U.S. Fish and Wildlife Service (USFWS) biological opinions. Information provided in draft Environmental Assessments for long-term renewals for the Friant Division and Cross Valley Contractors, dated October 16, 2000 and received by NMFS on October 24, 2000 were also used in this consultation.

*Consultation History*

In a letter dated October 30, 2000 Reclamation initiated informal consultation on the renewal of all long-term CVP water service contracts and requested concurrence from the NMFS with a determination that this action would have no adverse effects on Sacramento River winter-run chinook salmon, Central Valley spring-run chinook salmon, and Central Valley steelhead. After reviewing the material provided in Reclamations October 30, 2000 request, the NMFS determined that the information provided was inadequate to support a conclusion of no adverse effect and did not concur with Reclamation's determination (January 5, 2001 letter from R. Lent,

NMFS, to J. Davis, Reclamation). Subsequently, on January 5, 2001 the NMFS received a request from Reclamation for formal consultation under section 7 of the ESA on the effects of the long-term contract renewal of CVP water service contracts for the Friant Division and Cross Valley Canal Unit Contractors (January 5, 2001 letter from F. Michny, Reclamation, to R. Lent, NMFS).

Also, relevant to this consultation is the existing NMFS 1993 biological opinion on the CVP/State Water Project (SWP) Operations (as amended in 1995) and an ongoing consultation to update that opinion. That opinion is relevant because it contains operating criteria and procedures for the CVP and SWP facilities necessary to avoid jeopardy of winter-run chinook salmon. It also contains terms and conditions to minimize the amount of incidental take allowed in the incidental take statement. This opinion is currently undergoing reinitiation of consultation to expand it to include spring-run chinook salmon and steelhead ESUs. While most of the winter-run protection and minimization measures also protect spring-run chinook salmon and steelhead, particularly in the Delta, that opinion does not include consideration of the operation of Federal and State Facilities in watersheds in which winter-run chinook salmon do not occur. Given that determining the extent of take associated with the diversion of a volume of water independent of consideration of operational criteria is not possible, NMFS is not authorizing incidental take in this opinion but will defer authorizing take to the completion of the revised opinion on CVP/SWP operations. That opinion is anticipated to be completed prior to March 1, 2001.

## **II. PROPOSED ACTION**

Reclamation proposes to renew CVP long-term water service and repayment contracts for the twenty-eight (28) Friant Division water contractors and the eight (8) Cross Valley water contractors for a period of 25 years, from March 1, 2001 through February 28, 2026. Full contract entitlements are proposed to be delivered, when available. Entitlements are 737,500 acre-feet of Class 1 water and 1,387,475 acre-feet of Class 2 water for Friant Division. The maximum contracted amount of water exchanged for Cross Valley is 128,300 acre-feet. Reclamation will make deliveries in conformance with availability of water due to hydrological conditions, constraints established by California water law, and in conformance with other State and Federal laws that may affect operation of Reclamation's facilities including, but not limited to, the Endangered Species Act, the Magunson Stevens Fisheries Conservation and Management Act, and the Clean Water Act.

### *A. Proposed Long-Term Contract Renewals*

The renewal of long-term CVP water contracts would allow continued CVP water delivery to the contractors through the 25-year-long water service contracts. Water would continue to be delivered to CVP contractors through existing facilities. It would not involve the construction of any new facilities, the installation of any new structures, or the modification of existing facilities. The renewal of long-term contracts would continue to provide the existing supply for agriculture, and M&I use. Contract quantities have remained the same as previous contracts.

## 1. Contract water entitlements

There are 28 water service contractors in the Friant Division and 8 Cross Valley Contractors. In addition 2 contractors in the Friant Division also receive CVP water from H. V. Eastman Lake and Hensly Lake. Tables 1 and 2 describe the purpose of use, district size and water entitlements for the Friant Division and Cross Valley Contractors, respectively.

**Table 1. Friant Division water contractors, district size, maximum water entitlements and deliveries.**

Name	Purpose of Use of Water (AG or M&I)	Gross Acreage in Water District Boundary	Current Irrigable Acres	Annual Entitlement Class 1 (acre ft/yr)	Annual Entitlement Class 2 (acre ft/yr)	Average Annual Deliveries <sup>1&amp;2</sup> (acre-feet)	Maximum Annual Deliveries <sup>1&amp;2</sup> (acre-feet)
Arvin-Edison Storage District	Both	132,849	118,879	40,000	31,1675	45,560	183,117
Chowchilla Water District	AG	85,681	74,918	55,000	160,000	72,969	168,709
Delano-Earlimart Irrigation District	Both	56,505	50,856	108,800	74,500	95,565	152,592
Exeter Irrigation District	Both	15,181	13,385	11,500	19,000	9,682	15,393
Fresno County Waterworks District No. 18	M&I	253	NA	150	0	109	150
Fresno Irrigation District	Both	263,178	157,207	0	75,000	13,544	75,453
Garfield Water District	AG	1,797	1,705	3,500	0	3,102	4,382
Gravelly Ford Water District	AG	8,431	7,306	14,000	0	4,369	14,000
International Water District	Both	737	682	1,200	0	1,106	2,200
Ivanhoe Irrigation District	Both	11,202	10,401	7,700	7,900	9,262	10,874
Lewis Creek Water District	AG	1,233	1,185	1,450	0	1,580	2,472
Lindmore Irrigation District	Both	27,561	26,000	33,000	22,000	23,855	44,683
Lindsay-Strathmore Irrigation	Both	15,751	14,075	2,500	0	18,091	25,811
Lower Tule River Irrigation District	Both	103,270	90,448	27,500	0	109,839	273,896
County of Madera	M&I	154	NA	200	0	48	178

**Table 1. Friant Division water contractors, district size, maximum water entitlements and deliveries.**

Name	Purpose of Use of Water (AG or M&I)	Gross Acreage in Water District Boundary	Current Irrigable Acres	Annual Entitlement Class 1 (acre ft/yr)	Annual Entitlement Class 2 (acre ft/yr)	Average Annual Deliveries <sup>1&amp;2</sup> (acre-feet)	Maximum Annual Deliveries <sup>1&amp;2</sup> (acre-feet)
Madera Irrigation District	AG	130,689	118,113	85,000	186,000	124,296	213,500
Orange Cove, City of	M&I	959	NA	1,400	0	1,091	1,483
Orange Cove Irrigation District	Both	29,133	26,533	39,200	0	26,577	36,283
Porterville Irrigation District	AG	17,035	14,964	16,000	30,000	2,157	15,364
Saucelito-Irrigation District	Both	19,415	18,943	21,200	32,800	26,314	46,339
Shafter-Wasco Irrigation District	Both	38,993	34,957	50,000	39,600	48,334	86,935
Southern San Joaquin Municipal Utility District	Both	61,618	51,004	97,000	50,000	88,072	121,226
Stone Corral Irrigation District	AG	6,587	6,429	10,000	0	8,296	10,001
Tea Pot Dome Water District	AG	3,629	3,360	7,500	0	6,172	7,500
Terra Bella Irrigation District	Both	15,720	12,819	29,000	0	14,155	26,214
Tulare Irrigation District	Both	75,325	66,337	30,000	141,000	43,959	127,689
<b>TOTAL</b>		<b>570,248</b>	<b>235,346</b>	<b>692,801</b>	<b>1,149,477</b>		

<sup>1</sup> Annual Deliveries are the sum of Class 1 and Class 2 waters.

<sup>2</sup> Reported amounts may exceed contract entitlement due to a transfer of Project water from one contractor to another.

**Table 2. Cross Valley Division water contractors, district size, maximum water entitlements and deliveries.**

Name	Purpose of Use of Water	Gross Acreage in Water District Boundary	Current Irrigable Acres	Annual Entitlement Class 1	Average Annual Deliveries <sup>1&amp;2</sup> (acre-feet)	Maximum Annual Deliveries <sup>1&amp;2</sup> (acre-feet)
Pixely Irrigation District	Both	69,953	56,047	31,102	14,919	36,296
Hill's Valley Irrigation District	Both	4,010	3,174	3,346	1,376	3,477

**Table 2. Cross Valley Division water contractors, district size, maximum water entitlements and deliveries.**

Kern-Tulare Water District	Both	21,853	20,457	40,000	14,518	38,625
Lower Tule River Irrigation District	Both	103,270	90,448	31,102	13,250	30,266
County of Tulare <sup>3</sup>	Both	20,030	13,628	5,308	1,996	5,865
Rag Gulch Water District	Both	6,047	5,674	13,300	5,632	20,048
County of Fresno	Both	0	0	3,000	1,078	2,919
Tri-Valley Water District	Both	2,900	1,860	1,142	805	4,487
<b>TOTAL</b>		<b>228,272</b>	<b>191,288</b>	<b>128,301</b>		

<sup>1</sup> Annual Deliveries are the sum of Class 1 and Class 2 waters.

<sup>2</sup> Reported amounts may exceed contract entitlement due to a transfer of Project water from one contractor to another.

<sup>3</sup> Includes Alpaugh Irrigation District and Atwell Island Water District

## 2. Contract Terms

Table 3 is a summary of contract provisions taken from the environmental assessment provided by Reclamation (U.S. Bureau Reclamation 2000). This biological opinion is based upon analyzing the specific proposed actions contained in that document. Water service contracts will be executed on March 1, 2001 and expire on February 28, 2026.

**Table 3. Summary of Contract Provisions For Friant Division and Cross Valley Contractors Long-Term Contract Renewals.**

Provision	Based on Final Negotiated Contract
<b>Explanatory Recitals</b>	Assumes water rights held by CVP from SWRCB for use by water service contractors under CVP policies
	Assumes CVP has been relied upon and considered essential by contractors
	Assumes Secretary through coordination, cooperation and partnership will pursue measures to improve water supply
	Assumes that loss of water supply reliability would have impact on socioeconomic conditions and change land use
<b>Definitions</b>	
"Charges"	Assumes rewording of definition of Charges to exclude both Rates and Tiered Pricing Increments
"Contract Total"	Contract Total described as Total Contract
"Landholder"	Landholder described in existing Reclamation Law
"M&I Water"	Assumes rewording to provide water for irrigation of land in units less than or equal to 5 acres as M&I water unless Contracting Officer satisfied use is irrigation
Terms of Contract - Right to Use Contract	Assumes contracts shall be renewed subject to conditions for Ag and unconditioned for M&I
	Sets Dec. 31, 2024 as date on which determination on conversion may be made upon mutually agreeable terms

**Table 3. Summary of Contract Provisions For Friant Division and Cross Valley Contractors Long-Term Contract Renewals.**

<b>Provision</b>	<b>Based on Final Negotiated Contract</b>
Water to be Made Available and Delivered to the Contractor	Assumes water availability in any year dependent upon existing conditions
	Assumes compliance with Biological Opinions and other environmental documents for contracting. Requires contractor is within legal authority to implement.
	Assumes that current operating policies strive to minimize impacts to CVP water users
Time for Delivery of Water	Assumes methods for determining timing of deliveries as in existing contracts
Point of Diversion and Responsibility for Distribution of Water	Assumes methods for determining point of diversion as in existing contracts
Measurement of Water Within District	Assumes measurement for each turnout or connection for facilities that are used for all water supplies
Rates and Method of Payment for Water	Assumes Tiered Pricing is total water quantity. Assumes advanced payment for rates for 2 months. Excludes class 2 water taken during uncontrolled season from tiered pricing.
Non-interest Bearing Operation and Maintenance Deficits	Assumes language from existing contracts
Sales, Transfers, or Exchanges of Water	Assumes continuation of transfers with rate for transferred water being transferor's rate adjusted for additional or reduced costs related to transfer and adjusted to remove any ability to pay relief.
Application of Payments and Adjustments	Assumes minor changes associated with methods described for overpayment including requirement for \$1,000 or greater overpayment for refund.
Temporary Reduction - Return Flows	Assumes that current operating policies strives to minimize impacts to CVP water users
Constraints on Availability of Project Water	Assumes that current operating policies strives to minimize impacts to CVP water users
Unavoidable Groundwater Percolation	Assumes that some of applied CVP water will percolate to groundwater
Rules and Regulations	Assumes that CVP will operate in accordance with then existing rules
Water and Air Pollution Control	Assumes that CVP will operate in accordance with then existing rules
Quality of Water	Assumes that CVP will operate in accordance with existing rules without obligation to operate towards water quality goals
Water Acquired by the Contractor Other than from the United States	Assumes that CVP will operate in accordance with existing rules
Opinions and Determinations	Assumes minor changes with respect to references to the right to seek relief
Coordination and Cooperation	Assumes that coordination and cooperation between CVP operations and users should be implemented and CVP users should participate in CVP operational decisions. Parties retain exclusive decision making authority.
Charges for Delinquent Payments	Assumes that CVP will operate in accordance with existing rules



**Table 3. Summary of Contract Provisions For Friant Division and Cross Valley Contractors Long-Term Contract Renewals.**

<b>Provision</b>	<b>Based on Final Negotiated Contract</b>
Equal Opportunity	Assumes that CVP will operate in accordance with existing rules
General Obligation	Assumes that CVP will operate in accordance with existing rules, however assumes no requirement for contractor to levy in advance
Compliance with Civil Rights Laws and Regulations	Assumes that CVP will operate in accordance with existing rules
Privacy Act Compliance	Assumes that CVP will operate in accordance with existing rules
Contractor to Pay Certain Miscellaneous Costs	Assumes that CVP will operate in accordance with existing rules
Water Conservation	Assumes compliance with conservation programs established by Reclamation and the State
Existing or Acquired Water or Water Rights	Assumes that CVP will operated in accordance with existing rules
Operation and Maintenance by Non-federal Entity	Assumes minor changes to language that would allow subsequent modification of operational responsibilities
Contingent on Appropriation or Allotment of Funds	Assumes that CVP will operate in accordance with existing rules
Books, Records, and Reports	Assumes changes for record keeping for both CVP operations and CVP users
Assignment Limited	Assumes changes to facilitate assignments
Severability	Assumes that CVP will operate in accordance with existing rules
Resolution of Disputes	Assumes a Dispute Resolution Process
Officials Not to Benefit	Assumes that CVP will operate in accordance with existing rules
Changes in Contractor's Service Area	Assumes changes to limit rationale used for non-consent with no set time limit for assumed consent
Notices	Assumes that CVP will operate in accordance with existing rules
Confirmation of Contract	Assumes Court confirmation of contract and includes provision that contract not binding until court confirms is deleted.

### 3. Contract Shortage Provisions

In addition to the contract terms described above, Reclamation has indicated that the contracts contain shortage provisions that allow for reduction of deliveries for various reasons, including the need for CVP operations to be modified to meet requirements of listed species (January 5, 2001 letter from F. Michny, Reclamation, to R. Lent, NMFS). Reclamation is currently in consultation with NMFS on the effects of the CVP/SWP on Central Valley Spring-run chinook salmon and Central Valley steelhead. These conditions on contract deliveries are expected to

preclude delivery of full contract entitlements in most water years with existing facilities for storing and conveying water.

#### 4. Adaptive Management Committee

Reclamation proposes that an Adaptive Management Committee (AMC) be established and maintained to study threatened and endangered fish, wildlife and botanical species and their habitat in the Friant Division and Cross Valley. The goal of the AMC is to develop information necessary to evaluate and monitor the effects of implementing the project description and develop management practices that will benefit the biological resources. The AMC will provide scientific advice for funding, research, design, development, construction and implementation of conservation measures and protection arising under this Biological Opinion such as Habitat Conservation Plans, Best Management Practices or Contingency Plans. Membership in the AMC will be made up of 1 (one) representative each from Reclamation, Friant Division, Cross Valley, the Fish and Wildlife Service (FWS) and California Department of Fish and Game. Reclamation will serve as Chair of the AMC. All decisions made by the AMC which could reasonably be expected to affect threatened or endangered species must be approved by the FWS before implementation. AMC will require 30 working days to review such AMC decisions and any supporting data.

The AMC will meet as often as needed but at least once a year. Reports of monitoring studies, research, plan accomplishments and implementation of this Biological Opinion will be prepared by the AMC and submitted to the FWS annually.

#### 5. Operation and Maintenance

Operation and Maintenance (O&M) measures are not included in the proposed action. Reclamation is preparing O&M Manuals. Reclamation will consult with the NMFS on these actions prior to their implementation.

##### *B. Action area and geographic scope*

The action area considered in this biological opinion includes the immediate contract service areas characterized in the project descriptions and the entire area where effects to listed species extend as a direct and/or indirect effect of the proposed action.

The contract service areas include portions of Merced, Madera, Fresno, Tulare, and Kern Counties. Portions of the San Joaquin River, Fresno River, Kern River and Chowchilla River and lands immediately adjacent to river channels are considered to be within the contract service areas.

In addition, other portions of the Central Valley Project (CVP) service area are considered within the action area of this biological opinion. These areas primarily include the Sacramento-San Joaquin River Delta (Delta) and the San Joaquin River downstream of Friant Dam to the Delta. However, additional areas within the CVP service area may also be included depending on how the proposed long-term contract renewals affect overall CVP operations. These areas are

included because the proposed long-term contract renewals are described as: 1) necessary to continue beneficial use of water, developed and managed as part of the CVP, including the needs of fish and wildlife protection, restoration, mitigation, and enhancement; 2) for the purpose of maintaining consistency with the provisions of the CVPIA; and, 3) water deliveries to the Cross Valley Contractors originate in the Delta.

### 1. Friant Division

The Friant Division and operating facilities, including Friant Dam (Millerton Lake), the Friant Kern Canal (FKC) and the Madera Canal (MC) are located on the eastern side of the San Joaquin Valley. Water for the Friant Division comes from the San Joaquin River, impounded at Millerton Lake which has a storage capacity of 520,000 acre-feet. From there water is released to the 152-mile long FKC which flows south and to the 36-mile long MC which flows north. The flow rate of the FKC and the MC is 5,300 and 1,000 ft<sup>3</sup>/sec respectively. The terminus for the FKC is the Kern River and the MC is the Chowchilla River. Water conveyed to the Friant Division is categorized as Class 1 and Class 2. Class 1 water is water that is available for delivery on an annual basis as a dependable water supply during each year. Class 2 water may be available but it is not a reliable supply during the year.

### 2. Cross Valley Contractors

In 1975, a locally financed Cross Valley Canal (Canal) began operations that routed water from the California Aqueduct (Aqueduct) to the east side of the San Joaquin valley. The Canal connects to the Aqueduct near Taft, California and conveys water across the valley to the vicinity of the Friant-Kern Canal. The Canal actually does not connect with the Friant-Kern Canal. Instead, water is delivered to the Arvin-Edison Storage District (District) in exchange for a portion of CVP water available through Millerton Lake. Through a series of complex water purchase, transport and exchange agreements, water is exchanged between the District and six of the Cross Valley Contractors with contracts for CVP water pumped from the Delta. These exchange contractors are located north of the Canal, along the Friant-Kern Canal.

The District annually exchanges water with six Cross Valley contractors on a 1:1 water exchange ratio. Two of the Cross Valley Contractors do not participate in a water exchange with the District. Pixley Irrigation District and Lower Tule River Irrigation District have discontinued the exchange with the District and have transferred their water to other CVP water contractors. In turn they use proceeds from the transfers to purchase water from willing sellers.

## **III. STATUS OF LISTED SPECIES AND CRITICAL HABITAT**

The Sacramento River winter-run chinook salmon (*Oncorhynchus tshawytscha*) are listed as endangered under the ESA (January 4, 1994, 59 FR 440). This Evolutionarily Significant Unit<sup>1</sup> (ESU) consists of the Sacramento River population in California's Central Valley. Designated

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<sup>1</sup>For purposes of conservation under the Endangered Species Act, an Evolutionarily Significant Unit (ESU) is a distinct population segment that is substantially reproductively isolated from other conspecific population units and represents an important component in the evolutionary legacy of the species (Waples 1991).

critical habitat for Sacramento River winter-run chinook salmon includes the waterways, bottom, and water of the waterways and adjacent riparian zones of the Sacramento River from Keswick Dam, Shasta County (RM 302) to Chipps Island (RM 0) at the westward margin of the Sacramento-San Joaquin Delta; all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge (June 16, 1993, 58 FR 33212). This critical habitat designation includes the river water, river bottom (including those areas and associated gravel used by winter-run chinook salmon as a spawning substrate), and the adjacent riparian zone used by fry and juveniles for rearing. In areas westward from Chipps Island, including San Francisco Bay to the Golden Gate Bridge, it includes the estuarine water column, essential foraging habitat, and food resources used by the winter-run chinook salmon as part of their juvenile out-migration or adult spawning migration.

Central Valley (CV) spring-run chinook salmon (*O. tshawytscha*) are listed as threatened under the ESA (September 16, 1999, 64 FR 50394). This ESU consists of spring-run chinook salmon occurring in the Sacramento River Basin. Designated critical habitat for CV spring-run chinook salmon includes all river reaches accessible to listed chinook salmon in the Sacramento River and its tributaries in California, except for reaches on Indian tribal lands. Also included are river reaches and estuarine areas of the Sacramento-San Joaquin Delta, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. This critical habitat designation includes all waterways, substrate, and adjacent riparian zones. Excluded are: (1) areas above specific dams identified in the Federal Register notice; (2) areas above longstanding, natural impassable barriers (i.e., natural waterfalls in existence for at least several hundred years); and (3) Indian tribal lands (February 16, 2000, 65 FR 7764).

Central Valley (CV) steelhead (*O. mykiss*) are listed as threatened under the ESA (March 19, 1998, 63 FR 13347). This ESU consists of steelhead populations in the Sacramento and San Joaquin River Basins in California's Central Valley. Designated critical habitat for CV steelhead includes all river reaches accessible to listed steelhead in the Sacramento and San Joaquin rivers and their tributaries in California, except for reaches on Indian tribal lands. Also included are river reaches and estuarine areas of the Sacramento-San Joaquin Delta, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Excluded are: (1) areas above specific dams identified in the Federal Register notice; (2) areas above longstanding, natural impassable barriers (i.e., natural waterfalls in existence for at least several hundred years); (3) Indian tribal lands; and (4) areas of the San Joaquin River upstream of the Merced River confluence (February 16, 2000, 65 FR 7764).

Following are descriptions of the general life histories and population trends of listed species that may be directly or indirectly affected by the proposed action.

## A. Chinook Salmon

### 1. General Life History

Chinook salmon historically ranged from the Ventura River in southern California north to Point Hope, Alaska, and in northeastern Asia from Hokkaido, Japan to the Anadyr River in Russia (Healey 1991).

Of the Pacific salmon, chinook salmon exhibit arguably the most diverse and complex life history strategies. Healey (1986) described 16 age categories for chinook salmon, 7 total ages with 3 possible freshwater ages. Two generalized freshwater life-history types were described by Healey (1991): "stream-type" chinook salmon reside in freshwater for a year or more following emergence, whereas "ocean-type" chinook salmon migrate to the ocean within their first year.

Chinook salmon mature between 2 and 6+ years of age (Myers *et al.* 1998). Freshwater entry and spawning timing are generally thought to be related to local water temperature and flow regimes (Miller and Brannon 1982). Runs are designated on the basis of adult migration timing; however, distinct runs also differ in the degree of maturation at the time of river entry, thermal regime and flow characteristics of their spawning site, and actual time of spawning (Myers *et al.* 1998). Spring-run chinook salmon tend to enter freshwater as immature fish, migrate far upriver, and finally spawn in the late summer and early autumn. Fall-run chinook salmon enter freshwater at an advanced stage of maturity, move rapidly to their spawning areas on the mainstem or lower tributaries of the rivers, and spawn within a few days or weeks of freshwater entry (Healey 1991).

Central Valley spring-run chinook salmon adults are estimated to leave the ocean and enter the Sacramento River from March to July (Myers *et al.* 1998). Spring-run chinook spawning typically occurs between late-August and early October with a peak in September. Spawning typically occurs in gravel beds that are located at the tails of holding pools (USFWS 1995). Eggs are deposited within the gravel where incubation, hatching, and subsequent emergence takes place. The upper preferred water temperature for spawning adult chinook salmon is 55° F (Chambers 1956) to 57° F (Reiser and Bjornn 1979). Length of time required for eggs to develop and hatch is dependant on water temperature and is quite variable. In Butte and Big Chico creeks, emergence of spring-run chinook typically occurs from November through January. In Mill and Deer creeks, colder water temperatures delay emergence to January through March (CDFG 1998).

Post-emergent fry seek out shallow, near shore areas with slow current and good cover, and begin feeding on small terrestrial and aquatic insects and aquatic crustaceans. In Deer and Mill creeks, juvenile spring-run chinook usually spend 9-10 months in their natal streams, although some may spend as long as 18 months in freshwater. Most "yearling" spring-run chinook move downstream in the first high flows of the winter from November through January (USFWS 1995; CDFG 1998). In Butte and Big Chico creeks, spring-run chinook juveniles typically exit their natal tributaries soon after emergence during December and January, while some remain throughout the summer and exit the following fall as yearlings. In the Sacramento River and other tributaries, juveniles may begin migrating downstream almost immediately following

emergence from the gravel with emigration occurring from December through March (Moyle, *et al.* 1989; Vogel and Marine 1991). Fry and parr may spend time rearing within riverine and/or estuarine habitats including natal tributaries, the Sacramento River, non-natal tributaries to the Sacramento River, and the Delta.

Chinook salmon spend between one and four years in the ocean before returning to their natal streams to spawn (Myers *et al.* 1998). Fisher (1994) reported that 87 percent of returning spring-run adults are three-years-old based on observations of adult chinook trapped and examined at Red Bluff Diversion Dam between 1985 and 1991.

Adult Sacramento River winter-run chinook salmon leave the ocean and migrate through the Sacramento-San Joaquin Delta to the upper Sacramento River from December through June. Spawning generally occurs between mid-April and July, and occasionally into early August. The majority of winter-run chinook salmon spawning occurs upstream of Red Bluff Diversion Dam in the vicinity of Redding, California. The eggs are fertilized and buried in the river gravel where they incubate and hatch in approximately a two-month period.

Emergence of the fry from the gravel begins during early July and continues through September. Fall and winter emigration behavior by juveniles varies with streamflow and hydrologic conditions. Most juveniles redistribute themselves to rear in the Sacramento River through the fall and winter months. Some winter-run chinook salmon juveniles move downstream to rear in the lower Sacramento River and Delta during the late fall and winter. Smolting and ocean entry typically occurs between January and April.

## 2. Population Trends - Sacramento River Winter-Run Chinook Salmon

Historically, the winter run chinook salmon was abundant in the McCloud, Pit, and Little Sacramento rivers. Construction of Shasta Dam in the 1940s eliminated access to all of the historic spawning habitat for winter-run chinook salmon in the Sacramento River Basin. Since then, the ESU has been reduced to a single spawning population confined to the mainstem Sacramento River below Keswick Dam; although some adult winter-run chinook have been observed in Battle Creek, tributary to the upper Sacramento River, in recent years. The fact that this ESU is generally comprised of a single population with very limited spawning and rearing habitat increases its risk of extinction due to local catastrophe or poor environmental conditions. There are no other natural populations in the ESU to buffer it from natural fluctuations.

Quantitative estimates of run-size are not available for the period prior to the completion of Red Bluff Diversion Dam in 1966. CDFG estimated spawning escapement of Sacramento River winter-run chinook salmon at 61,300 (60,000 mainstem, 1,000 in Battle Creek, and 300 in Mill Creek) in the early 1960s, but this estimate was based on "comparisons with better-studied streams" rather than actual surveys. During the first 3 years of operation of the counting facility at Red Bluff Diversion Dam (1967-1969), the spawning run of winter-run chinook salmon averaged 86,500 fish. From 1967 through the mid-1990's, the population declined at an average rate of 18 percent per year, or roughly 50 percent per generation. The population reached critically low levels during the drought of 1987-1992; the 3-year average run size for period of

1989 to 1991 was 388 fish. However, the trend in the past 5 years indicates the population may be recovering. The most recent 3-year (1997-1999) average run-size was 2,220 fish.

Additional historical and recent published chinook salmon abundance information are summarized in Myers *et al.* (1998).

### 3. Population Trends - Central Valley Spring-Run Chinook Salmon

Historically, spring-run chinook salmon were predominant throughout the Central Valley, occupying the upper and middle reaches of the San Joaquin, American, Yuba, Feather, Sacramento, McCloud, and Pit rivers, with smaller populations in most other tributaries with sufficient habitat for over-summering adults (Stone 1874; Rutter 1904; Clark 1929). The Central Valley drainage as a whole is estimated to have supported spring-run chinook salmon runs as large as 600,000 fish between the late 1880s and 1940s (CDFG 1998). Before the construction of Friant Dam, nearly 50,000 adults were counted in the San Joaquin River (Fry 1961). Following the completion of Friant Dam, the native population from the San Joaquin River and its tributaries was extirpated. Spring-run chinook salmon no longer exist in the American River due to the existence and operation of Folsom Dam.

Natural spawning populations of Central Valley spring-run chinook salmon are currently restricted to accessible reaches in the upper Sacramento River, Antelope Creek, Battle Creek, Beegum Creek, Big Chico Creek, Butte Creek, Clear Creek, Deer Creek, Feather River, Mill Creek, and Yuba River (CDFG 1998; USFWS, unpublished data). With the exception of Butte Creek and the Feather River, these populations are relatively small ranging from a few fish to several hundred. Butte Creek returns in 1998 and 1999 numbered approximately 20,000 and 3,600, respectively (CDFG unpublished data). On the Feather River, significant numbers of spring-run chinook, as identified by run timing, return to the Feather River Hatchery. However, coded-wire-tag information from these hatchery returns indicates substantial introgression has occurred between fall-run and spring-run chinook populations in the Feather River due to hatchery practices.

Additional historical and recent published chinook salmon abundance information are summarized in Myers *et al.* (1998).

## B. *Steelhead*

### 1. General Life History

Steelhead exhibit a complex suite of life history traits. They can be anadromous or freshwater resident. Resident forms are usually called rainbow trout. Winter steelhead generally leave the ocean from August through April, and spawning occurs between December and May (Busby *et al.* 1996). The timing of upstream migration is generally correlated with higher flow events and associated lower water temperatures. Unlike Pacific salmon, steelhead are iteroparous, or capable of spawning more than once before death (Busby *et al.* 1996). However, it is rare for steelhead to spawn more than twice before dying; most that do so are females (Busby *et al.*

1996; Nickelson *et al.* 1992). Iteroparity is more common among southern steelhead populations than northern populations (Busby *et al.* 1996).

Steelhead spawn in cool, clear streams featuring suitable gravel size, depth, and current velocity. Intermittent streams may be used for spawning (Barnhart 1986; Everest 1973). The length of the incubation period for steelhead eggs is dependant on water temperature, dissolved oxygen concentration, and substrate composition. In late spring and following yolk sac absorption, alevins emerge from the gravel as fry and begin actively feeding in shallow water along perennial stream banks (Nickelson *et al.* 1992).

Summer rearing takes place primarily in higher velocity areas in pools, although young-of-the-year are also abundant in glides and riffles. Winter rearing occurs more uniformly at lower densities across a wide range of fast and slow habitat types. Productive steelhead habitat is characterized by complexity, primarily in the form of large and small wood. Some older juveniles move downstream to rear in larger tributaries and mainstem rivers (Nickelson *et al.* 1992). Juveniles feed on a wide variety of aquatic and terrestrial insects (Chapman and Bjornn 1969), and emerging fry are sometimes preyed upon by older juveniles. Juveniles live in freshwater from one to four years (usually two years in the California) (Barnhart 1986), then smolt and migrate to the sea from February through April. Although some steelhead smolts may outmigrant during the fall and early winter months.

California steelhead typically reside in marine waters for one to two years prior to returning to their natal stream to spawn as three- or four-year olds (Busby *et al.* 1996).

## 2. Population Trends - Central Valley steelhead

Central Valley steelhead once ranged throughout most of the tributaries and headwaters of the Sacramento and San Joaquin basins prior to dam construction, water development, and watershed perturbations of the 19<sup>th</sup> and 20<sup>th</sup> centuries (McEwan and Jackson 1996; CALFED 2000). In the early 1960s, the California Fish and Wildlife Plan estimated a total run size of about 40,000 adults for the entire Central Valley including San Francisco Bay (CDFG 1965). The annual run size for this ESU in 1991-92 was probably less than 10,000 fish based on dam counts, hatchery returns and past spawning surveys (McEwan and Jackson 1996).

At present, all Central Valley steelhead are considered winter-run steelhead (McEwan and Jackson 1996), although there are indications that summer steelhead were present in the Sacramento River system prior to the commencement of large-scale dam construction in the 1940's (IEP Steelhead Project Work Team 1999). McEwan and Jackson (1996) reported wild steelhead stocks appear to be mostly confined to upper Sacramento River tributaries such as Antelope, Deer, and Mill creeks and the Yuba River. However, naturally spawning populations are also known to occur in Butte Creek, and the upper Sacramento mainstem, Feather, American, Mokelumne, and Stanislaus Rivers (CALFED 2000). It is possible that other naturally spawning populations exist in Central Valley streams, but are undetected due to lack of monitoring and research programs. The recent implementation of new fisheries monitoring efforts has found steelhead in streams previously thought not to contain a population, such as Auburn Ravine, Dry Creek, and the Stanislaus River (IEP Steelhead Project Work Team 1999).



Additional historical and recent published steelhead abundance are summarized in the NMFS west coast steelhead status review (Busby *et al.* 1996).

#### IV. ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area (50 CFR §402.02). The action area encompasses a large portion of California's Central Valley and includes the Sacramento-San Joaquin River Delta (Delta), the San Joaquin River downstream of Friant Dam to the Delta, and, depending on how the proposed action affects Central Valley Project (CVP) operations, other portions of the CVP service area.

Profound alterations to the riverine habitat of the Central Valley began with the discovery of gold in the middle of the last century. Dam construction, water diversion, and hydraulic mining soon followed, launching the Central Valley into the era of water manipulation and coincident habitat degradation. A number of documents have addressed the history of human activities, present environmental conditions, and factors contributing to the decline of salmon and steelhead species in the Central Valley. For example, NMFS has prepared range-wide status reviews for west coast chinook (Myers *et al.* 1998) and steelhead (Busby *et al.* 1996). Information is also available in Federal Register notices announcing ESA listing proposals and determinations for some of these species and their critical habitat (June 16, 1993, 58 FR 33212; January 4, 1994, 59 FR 440; March 19, 1998, 63 FR 13347; September 16, 1999, 64 FR 50394; February 16, 2000, 65 FR 7764). The final Programmatic Environmental Impact Statement/Report for the CALFED Bay-Delta Program (July 2000) (CALFED 2000) and the final PEIS for the CVPIA (October 1999) (DOI 1999a) provide a summary of historical and recent environmental conditions for salmon and steelhead in the Central Valley and describe programs that have been established to restore endangered species populations over the next 30 years. For the purposes of this document, a general description of the environmental baseline for Sacramento River winter-run chinook salmon, Central Valley spring-run chinook salmon, and Central Valley steelhead is based on a summarization of these documents.

##### *A. Status of Listed Chinook Salmon and Critical Habitat in the Action Area*

Winter- and spring-run chinook salmon no longer occur within the San Joaquin Basin. Viable populations of these listed species currently spawn and rear in accessible river reaches in the upper Sacramento River Basin. All river reaches and estuarine areas of the Sacramento-San Joaquin Delta may be used seasonally by adult and juvenile winter- and spring-run chinook salmon, primarily during migration periods. Designated critical habitat for these species include all river reaches and estuarine areas of the Sacramento-San Joaquin Delta. The essential elements of designated critical habitat are the water, substrate, and adjacent riparian areas.

##### *B. Status of Listed Central Valley Steelhead and Critical Habitat in the Action Area*

Until recently, steelhead were considered to be extinct throughout the San Joaquin River system (Reynolds et al 1990, Cramer et al 1995). However, evidence has been gathered over the past few years that shows an extant, self-sustaining run in at least the lower reaches of the San Joaquin River. This conclusion is based on various documented reports of yearling and/or adult size fish and smolts being captured or observed in the lower San Joaquin River and/or its tributaries (the Calaveras, Mokelumne, Stanislaus, Tuolumne, and Merced Rivers) (McEwan 1997). Despite these findings no steelhead have been documented in the San Joaquin River above the confluence of the Merced River and this area has been excluded from critical habitat designation for the San Joaquin Basin. NMFS excluded the area above the confluence of the Merced because the reach of the San Joaquin between the Merced and Friant Dam is typically inhospitable to steelhead during the summer months and CDFG intentionally excludes steelhead from entering that reach of the river.

Throughout the remainder of the Central Valley steelhead ESU, populations of native fish have declined dramatically since Euro-American settlement began in the mid-1800s (USFWS, 1998). These declines are due primarily to dam construction, aggregate mining, water diversions, clearing and filling for agriculture, fishing and other human activities (Kondolf et al., 1996). Although information is available documenting the overall range of steelhead within the ESU, accurate estimates of population distribution within the various tributaries are lacking. However, a general idea of the relative population distribution can be derived through a comparison of angler effort specifically targeting steelhead in the Central Valley ESU. Angler surveys during calendar year 1999 found that all of the angler effort targeting steelhead in the San Joaquin system occurred on the Mokelumne River and Stanislaus River and was generally less than 1% of the total effort targeting steelhead throughout the ESU (0.69% in the Mokelumne and 0.13% in the Stanislaus). No angler effort was reported in the mainstem San Joaquin River, between the Stanislaus and Merced, or other tributaries (Tuolumne, Merced). Over 99% of the total angler effort reported for steelhead within the Central Valley ESU occurred in the Sacramento system, primarily the American, Feather, and Yuba Rivers (52.31%, 40.85%, and 3.61%, respectively) (preliminary data, CDFG 2000). Although angler effort is not a measure of abundance, the distribution of the effort is consistent with the available information (Busby *et al.* 1996) indicating a relative small portion of the ESU occupies habitat in tributary rivers to the lower San Joaquin River.

Adult steelhead migrate through the Delta and lower Sacramento and San Joaquin River corridors from October through May to reach spawning and rearing area in the tributaries. Rearing takes place over a period of one year or more. Fry rearing generally occurs from April to August with juvenile rearing occurring throughout the remainder of the year, with the smaller juveniles present from April through September. The emigration of juveniles begins in November and continues through May with the peak in February and March (USFWS, 1995). Since the majority of historical Central Valley steelhead spawning and rearing habitat in the Sacramento and San Joaquin River basins is no longer accessible due to impassable dams, the accessible areas of these river systems represent an essential portion of the critical habitat for the Central Valley steelhead ESU.

All emigrating juvenile Central Valley steelhead smolts use the lower reaches of the Sacramento and San Joaquin Rivers and the Delta as a migration corridor to the ocean. Some rearing may

also occur there. These juveniles may also utilize tidal and non-tidal freshwater marshes and other shallow water areas in the Delta as rearing areas for short periods prior to the final portion of their emigration to the sea. All adult steelhead use the Delta and lower reaches of the Sacramento and San Joaquin Rivers as an upstream migration corridor to return to their natal streams for spawning.

Except for areas of the San Joaquin River upstream of the confluence of the Merced River, which have been excluded, the action area is located within designated critical habitat of Central Valley steelhead. Critical habitat includes all accessible riverine and estuarine areas within the Sacramento and San Joaquin Rivers Basins, and includes the Sacramento-San Joaquin Delta. Areas of the San Joaquin River upstream of the Merced River confluence are excluded from critical habitat designation. The essential elements of designated critical habitat are the water, substrate, and adjacent riparian areas.

### *C. Factors Affecting Species Environment Within the Action Area*

Although the Friant Division is an integral part of the CVP, it is hydrologically independent and operates separately from the northern and southern CVP systems. Mendota Dam on the San Joaquin River was constructed in 1871 by water rights holders and formed the Mendota Pool. Although no information is available documenting the effects of Mendota Dam on salmon and steelhead it likely provided the first barrier on the upper San Joaquin and affected salmonids by blocking migration to historical spawning and rearing reaches, except during high flow periods. Since Friant Dam was completed in 1944, steelhead have been excluded from the upper reaches of the San Joaquin River where spawning and rearing habitat was provided by cold snow melt run off, and limited to the reaches of the San Joaquin near or on the Valley floor where lethal conditions exist for steelhead in the summer months. In addition, the majority of annual San Joaquin River flows are diverted to the Friant-Kern Canal and the Madera Canal. Releases from Friant Dam to the San Joaquin are currently made only to satisfy water rights above Gravelly Ford and for flood control purposes. Between Mendota Pool and the confluence of the Merced River the San Joaquin River is substantially dry, only receiving flows from agricultural runoff. Since 1992, barriers have been installed across the main San Joaquin River upstream of the Merced River confluence to guide migrating adult salmon into the Merced River effectively preventing their migration, and presumable that of steelhead as well, further upstream. NMFS has determined that this reach is not essential for the conservation and survival of the Central Valley ESU of steelhead because of the low probability of recreating suitable spawning and rearing conditions for steelhead between Friant Dam and the confluence of the Merced River.

The construction of dams blocking access to essential spawning and rearing habitat throughout the remainder of the action area is also a primary factor limiting abundance and distribution of salmon and steelhead within the lower San Joaquin system, and the Sacramento River system. However, there exists the potential for creating and managing suitable spawning and over summering habitat below many of the dams on tributaries to the Sacramento and San Joaquin Rivers because the reservoirs behind these dams stratify and create hypolimnions. These hypolimnions provide a source of cold water that can be used to cool river reaches below the dams and the river reaches below the dams are used to transport water to diversion facilities

which beyond steelhead are able to pass. For example, the CALFED ecosystem restoration program anticipates acquiring water to be used for temperature control on the American, Yuba, and Feather Rivers. This potential exists on the Stanislaus River and perhaps on the Tuolumne and Merced Rivers as well.

Other factors affecting species environment within the action area are water diversions, poor water quality, and riparian impacts. The CALFED ecosystem restoration program, multispecies conservation strategy, and water quality program includes measures to address these effects as well. For example CALFED has funded fish screens to minimize entrainment of fish at diversion facilities, acquisition of lands for restoration of shallow water rearing habitat, acquisition of water to ensure essential rearing and spawning habitat is covered by adequate flows, and removal of passage barriers. The CALFED program has already restored access to habitat in Butte, Battle and Clear Creeks by removing obsolete but impassible dams.

In addition to CALFED, the State and Federal water projects are subject to constraints on operations established by the states water quality control plan and water-rights orders, and by terms and conditions contained in biological opinions issued by the NMFS and the FWS for minimizing take of winter-run chinook salmon, delta smelt

Lastly, substantial blocks of water have been dedicated pursuant to CVPIA (b)(2) and via the establishment of the environmental water account implemented as part of the CALFED preferred alternative for use in improving habitat conditions for salmonids and minimizing or avoiding adverse effects of the project operations.

## **V. Effects of the Action**

This section discusses the direct and indirect effects on Sacramento River winter-run chinook salmon, Central Valley spring-run chinook salmon, and Central Valley steelhead, and/or their designated critical habitat that are expected to result from the proposed action. Cumulative effects (effects of future State, local, or private actions on endangered and threatened species or critical habitat) are discussed separately.

The following analysis of the effects of renewal of the long-term contracts is general in nature, but will assess the likely effects of contract renewal on the listed species. The contracts proposed for renewal by Reclamation are for certain amounts of water but contain various contingencies on that amount, such as availability of water supply and compliance with biological opinions. An analysis of the impacts of water storage and delivery within the CVP on Sacramento River winter-run chinook salmon can be found in the existing NMFS 1993 biological opinion on the CVP/SWP Operations (as amended in 1995). That analysis is representative of effects on spring-run chinook and steelhead generally and more specifically where they overlap in distribution.

Potential direct effects of long-term contract renewals for the Friant Division and the Cross Valley Contractors include continued retention of San Joaquin River water in Millerton Reservoir and diversion of most of the upper San Joaquin River flow into the FKC and MC for delivery to agricultural and urban water users. For fishery issues, this equates to changes in the timing of water storage in Millerton Lake and/or changes in the timing and magnitude of stream

flows in the San Joaquin River and Delta. Habitat between Friant Dam and the confluence with the Merced River will continue to be inhospitable to steelhead, because of a lack of instream flow and adverse temperatures. The diversions will continue to eliminate most of the upper San Joaquin River's contributions to flows to assist emigration of juvenile fall-run salmon and steelhead in late winter and spring months. Since winter-run chinook and spring-run chinook are not present in the San Joaquin River system they will not be affected by these circumstances. The Central Valley Steelhead ESU will be affected to the extent that the small portion of the ESU that is present in the San Joaquin system will continue to be precluded from reoccupying the upper San Joaquin River. These steelhead will also continue to experience diminished flows to facilitate immigration and emigration. This effect though is minimized by ongoing programs to improve rearing and migration conditions for salmon and steelhead in the San Joaquin System. These programs include the Vernalis pulse flows provided as a CVPIA (b)(2) action and habitat improvements funded by the CALFED ecosystem restoration program.

Potential indirect effects of the proposed contract renewals include changes in surface water storage at other CVP reservoirs (e.g. New Melones, Folsom), changes in stream flows in the lower San Joaquin River (between the confluence of the Merced River and the Delta) and changes in flows through the Delta and/or other CVP facilities as a result of deliveries to Friant Division or Cross Valley Contractors. For example, the reduction in mainstem San Joaquin flows, as a result of Friant contract deliveries, requires project operators to rely more on tributaries to contribute pulse flows to facilitate emigration of juvenile salmon and steelhead. The Vernalis pulse flows establishes a pulse flow in the spring to facilitate emigration. This flow generally comprised water from storage on the Stanislaus and other San Joaquin tributaries, which results in a reduction in the amount of water that could be reserved for temperature control in these rivers during the summer.

Flow changes within the Delta resulting from these contract renewals may also exacerbate conditions that entrain juveniles of all three listed salmonids into the southern Delta and the pumping plants of the CVP and State Water Project. The effect of reverse flows and on cross delta transport of water is discussed in the winter-run biological opinion. The winter-run biological opinion contains provisions for the operation of the delta cross channel gates that are designed to keep emigrating winter-run chinook juveniles on the northern side of the delta and minimize their exposure to flow conditions in the interior and southern delta. These provision also minimize exposure of spring run chinook and steelhead emigrating from the Sacramento River and its tributaries.

## **VI. Cumulative Effects**

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." For purposes of this analysis, the action area includes a large portion of California's Central Valley.

Non-Federal actions that may affect the action area include voluntary State or private sponsored habitat restoration activities, State hatchery practices, agricultural practices, water withdrawals/diversions, increased population growth, mining activities and urbanization. Habitat

restoration projects may have short-term negative effects associated with in-water construction work, but these effects are temporary, localized, and the outcome is a benefit to listed salmonids. State hatchery practices may have negative effects on naturally produced salmonids through genetic introgression, competition, and disease transmission resulting from hatchery introductions. Farming activities within or adjacent to the action area may have negative effects on water quality due to runoff laden with agricultural chemicals. Water withdrawals/diversions may result in entrainment of individuals into unscreened or improperly screened diversions, and may result in depleted river flows that are necessary for migration, spawning, rearing, flushing of sediment from spawning gravels, gravel recruitment and transport of large woody debris. Future urban development and mining operations in the action area may adversely affect water quality, riparian function, and stream productivity. Future land conservation and habitat restoration activities expected in the action area, such as those planned by the ongoing CVPIA and CALFED processes, are anticipated to offset many of the adverse effects associated with these non-Federal actions.

## **VII. Conclusion**

NMFS concludes the renewal CVP long-term water service and repayment contracts for the twenty-eight (28) Friant Division water contractors and the eight (8) Cross Valley water contractors for a period of 25 years is not likely to jeopardize the continued existence of winter-run chinook salmon, spring-run chinook salmon, or Central Valley steelhead, or result in the destruction or adverse modification of designated critical habitat for these species. This conclusion is based on the fact that the effects of the proposed action are for the most part confined to the San Joaquin River where they impact only a small portion of the Central Valley steelhead ESU and winter-run and spring-run chinook salmon are not present. There also has been and will continue to be improvements in the environmental baseline as a result of implementation of the CVPIA anadromous fisheries restoration plan and (b)(2) provision. Also, implementation of CALFED's ecosystem restoration program and environmental water account have improved the environmental baseline by improving habitat, increasing survival of juvenile salmon and steelhead, and providing tools to minimize the direct and indirect effects of the delta pumping facilities. This improvement in the environmental base line increases the resiliency of the listed salmon populations to the effect of deliveries pursuant to these contracts and provides resources to provide habitat for spawning and rearing of steelhead in the Stanislaus and Tuolumne Rivers, despite the potential for the reduction in flow from Friant to increase demands on these Rivers for contributions to pulse flows.

In addition Reclamation has included contract provisions that ensure Reclamation will comply with existing water quality control plan, and other applicable laws and regulations, including biological opinions and terms and conditions in incidental take statements. Reclamation has included contract provisions which limit delivery to amounts allowable under existing and future biological opinions and restrict contract impacts to those effects that are not likely to jeopardize listed species. For example, implementation of these contracts under the current opinion for winter-run chinook salmon is expected to affect CVP operations in a manner already considered under that opinion and determined not likely to jeopardize the winter-run chinook salmon. While the winter-run opinion does not analyze effects of project operations on spring-run chinook salmon or steelhead. Its terms and conditions and operation criteria also minimize take of spring-

run chinook salmon and steelhead in the Delta where presence of all three species tends to overlap in time.

Incidental take associated with the implementation of these water contracts will occur through the storage and delivery of the water. This storage and delivery is the responsibility of Reclamation and has been assessed under existing biological opinions and will be assessed under an upcoming opinion. Therefore, incidental take associated with this action has been and will be described in biological opinions on the CVP/SWP operations and no Incidental Take Statement is provided with this Opinion. As noted above a revised opinion on CVP/SWP operations and Incidental Take Statement is anticipated by March 1, 2001.

## **VIII. Conservation Recommendations**

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, or to develop information. The NMFS recommends that Reclamation:

1. Include NMFS as a member of the Adaptive Management Committee (AMC) to assist in evaluating and monitoring the effects of implementing contract renewals and to develop management practices that will benefit listed salmonids. All decisions by the AMC which could reasonably be expected to effect listed salmonids must be reviewed and approved by the NMFS before implementation.
2. If determined necessary and beneficial, release additional flows from Friant Dam to assist with fisheries flow needs in the lower San Joaquin River.
3. Explore and implement, if practicable, opportunities to operate and/or manage the Friant Division and/or Cross Valley Canal Unit in a manner beneficial to listed salmon and steelhead.
4. Initiate studies on the Lower San Joaquin River and the Stanislaus River to document and monitor the presents and distribution of Central Valley steelhead. These studies should document and map available habitat and examine ways to manage CVP facilities to benefit the species. In addition, Reclamation shall encourage cooperative efforts by the State and other operators within the San Joaquin Basin to document steelhead populations occupying other tributaries.

## **IX. Reinitiation of Consultation**

This concludes the programmatic consultation on the proposed long-term renewal of Central Valley Project (CVP) water service contracts for the Friant Division and Cross Valley Canal Unit Contractors. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the actions has been retained (or

is authorized by law) and if: (1) new information reveals effects of agency actions that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (2) the agency action is subsequently modified in a manner or to an extent not considered in this opinion; or (3) a new species is listed or critical habitat designated that may be affected by the action.



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# Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA)

## ESSENTIAL FISH HABITAT CONSERVATION RECOMMENDATIONS<sup>2</sup>

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) set forth new mandates for the National Marine Fisheries Service (NMFS), regional fishery management councils, and federal action agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NMFS, are required to delineate "essential fish habitat" (EFH) in fishery management plans (FMPs) or FMP amendments for all managed species. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding potential adverse effects of their actions on EFH.

The Pacific Fisheries Management Council has delineated Essential Fish Habitat (EFH) for the Pacific salmon fishery through amendment 14 to the Pacific Coast Salmon FMP (PFMC 1999). Fall-run chinook salmon (*Oncorhynchus tshawytscha*) occupy EFH within the action area of the preceding biological opinion and require EFH consultation under the MSFCMA.

### I. IDENTIFICATION OF ESSENTIAL FISH HABITAT

Essential fish habitat is defined in the MSFCMA as: "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity..." NMFS regulations further define "waters" to include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" to include sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" to mean the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" to cover a species' full life cycle.

The geographic extent of freshwater essential fish habitat (EFH) for the Pacific salmon fishery include waters currently or historically accessible to salmon within specific U. S Geological Survey hydrologic units (Pacific Fisheries Management Council, 1999). For the San Joaquin River Basin, aquatic areas identified as EFH for salmon are within the hydrologic unit map numbered 18050002 (titled: Mid. San Joaquin - L. Merced - L. Stanislaus).

Historically, the San Joaquin River, and its principal tributaries, the Merced, Tuolumne, and Stanislaus Rivers once supported spring and fall runs of chinook salmon (*Oncorhynchus tshawytscha*) (Reynolds et al. 1993). The spring run, formerly the most abundant salmon in the

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<sup>2</sup>The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) set forth new mandates for the National Marine Fisheries Service (NMFS) and federal action agencies to protect important marine and anadromous fish habitat. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding potential adverse effects of their actions on EFH, and respond in writing to NMFS "EFH Conservation Recommendations."

San Joaquin system, was extirpated by 1942 because of dam construction that blocked access to cold-water habitat upstream (Yoshiyama et al., 1996). The fall run has been reduced to a small remnant in the tributaries. In 1992, only 1,250 adults returned upstream to spawn including returns to a hatchery on the Merced River (Kondolf et al., 1996b). Recent estimates find that fall-run chinook have declined between 85 to 90 percent (Rich and Loudermilk, 1991; USFWS, 1995) of population levels which existed in the 1940's. Fall-run chinook spawning population estimates from the Stanislaus, Tuolumne and Merced Rivers from 1974 to 1991 show both rising and descending trends lasting for several years (Kano, 1996; 1998). Factors limiting salmon populations in these rivers include low instream flows, high water temperature, reversed flows in the Delta (drawing juveniles into large diversion pumps), loss of fish into unscreened agricultural diversion, predation (especially by warm-water fish species), and lack of rearing habitat (Kondolf et al., 1996a; 1996b). In the rivers, predation on outmigrating juveniles by exotic species (centrarchid basses) can be a major problem in the lower reaches (Hatton, 1940; USFWS, 1995). When flows increase, migration time is more rapid and water clarity and temperatures are lower, which decrease the effectiveness of predators (USFWS, 1995).

## **LIFE HISTORY AND HABITAT REQUIREMENTS**

General life history information for chinook salmon is summarized in Part III.A. of the preceding biological opinion. Further detailed information on chinook salmon ESUs are available in the NMFS status review of chinook salmon from Washington, Idaho, Oregon, and California (Myers et al., 1998), and the NMFS proposed rule for listing several ESUs of chinook salmon (NMFS, 1998).

## **II. PROPOSED ACTION.**

The proposed action is described in Part II of the preceding biological opinion.

## **III. EFFECTS OF THE PROJECT ACTION**

The direct and indirect effects of the proposed long-term renewal of CVP water service contracts to Friant Division and Cross Valley Contractors on EFH are described in Part V of the preceding biological opinion. Cumulative effects of the proposed action are described in Part VI of the preceding biological opinion.

## **IV. CONCLUSION**

Upon review of the potential effects of the proposed long-term renewal of CVP water service contracts for the Friant Division and Cross Valley Contractors, NMFS believes that this action may adversely effect on the identified EFH for Pacific salmon in the project area of the San Joaquin River Basin.

## **V. EFH CONSERVATION RECOMMENDATIONS**

NMFS recommends that the Conservation Measures described in the preceding biological opinion be adopted as EFH Conservation Recommendations for the San Joaquin River Basin with the following addition:

5. Consideration of measures to protect and enhance fall-run chinook salmon essential fish habitat shall be included in all conservation measures for anadromous salmonids within the San Joaquin Basin; and,
6. Opportunities to protect and enhance chinook salmon habitat shall be evaluated and implemented to the extent practicable.

This recommendation is provided as an advisory measure.

## **VI. BUREAU OF RECLAMATION'S STATUTORY REQUIREMENTS**

The Magnuson-Stevens Act and Federal regulations (50 CFR § 600.920) to implement the EFH provisions of the MSFCMA require federal action agencies to provide a written response to EFH Conservation Recommendations within 30 days of its receipt. A preliminary response is acceptable if final action cannot be completed within 30 days. Your final response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. If your response is inconsistent with our EFH Conservation Recommendations, you must provide an explanation of the reasons for not implementing them.

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